CLAIMS

The invention claimed is:

1. An apparatus for examining a region of a patient comprising:

an x-ray radiation source that directs radiation through the region:

an optical storage element that receives radiation transmitted through the region at a storage region of the optical storage element, the storage region having a two dimensional surface area;

a light source that illuminates the two dimensional surface area of the storage region of the optical storage element to induce a fluorescence emission of an image of the region from the storage region;

a two dimensional detector array optically coupled to the optical storage element such that the array receives the fluorescence emission at a plurality of pixels and generates an electronic representation of the tissue; and

a two dimensional optical coupling system that couples the image of the region onto the two dimensional detector array.

2. The apparatus of Claim 1 wherein the optical storage element comprises a photostimulable phosphor.

3. The apparatus of Claim 1 wherein the light source further comprises a laser.

4. The apparatus of Claim 1 wherein the light source further comprises a broadband light source.

5. The apparatus of Claim 1 further comprising a cassette that contains the optical storage element.

6. The apparatus of Claim 1 wherein the two dimensional optical coupling system comprises a thin film filter.

7. The apparatus of Claim 1 wherein the light source is stationary relative to the optical storage element during illumination.

8. The apparatus of Claim 1 wherein the optical coupling system comprises a fiberoptic device.

9. The apparatus of Claim 1 wherein the optical coupling system comprises an image intensifier.

10. The apparatus of Claim 1 wherein the optical coupling system comprises a lens.

11. The apparatus of Claim 1 further comprising a spatial light modulator between the light source and the optical storage element.

12. The apparatus of Claim 1 wherein the detector comprises a charge coupled device.

13. A method for examining tissue of a patient comprising the steps of:

directing x-ray radiation through the tissue of the patient to produce a radiation pattern that is transmitted onto an optical storage element, such that the optical storage element receives two dimensional radiation pattern representative of the spatial distribution and intensity of the radiation pattern;

directing light onto the optical storage element to produce an optical signal representative of the spatial distribution and intensity of the radiation pattern; and

receiving the optical signal on a two dimensional detector array comprising a plurality of pixels and generating an electronic representation of the tissue.

14. The method of Claim 13 wherein the optical storage element comprises a photostimulable phosphor.

15. The method of Claim 13 wherein the pulse of light is produced by a light source comprising a broadband light source.

16. The method of Claim 13 wherein the optical storage element is contained in a cassette.

17. The method of Claim 13 further comprising optically coupling the optical signal to the detector array with an optical element.

18. The method of Claim 17 further comprising filtering the optical signal with the optical element.

19. The method of Claim 17 further comprising intensifying the optical signal with an image intensifier.

20. An apparatus for examining a patient's spine comprising:

an x-ray radiation source emitting radiation which is directed through the spine;

an optical storage element having a surface area that receives the radiation transmitted through the spine;

a detector into which the optical storage element can be mounted comprising a detector array; and

a light source that can be optically coupled to the surface area of the optical storage element to stimulate the optical storage element to produce an optical signal that is transmitted onto the detector array.